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Research Article

Enhancing the Productivity of Cowpea through Frontline Demonstrations in Dharmapuri District of Tamil Nadu

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ABSTRACT

Cowpea is one of the major pulse crop grown in an area of 12999 ha in Dharmapuri district and the farmers were cultivating only the traditional varieties with non adoption of improved varieties and management practices resulted in poor yield. Hence to combat this problem frontline demonstration was conducted to demonstrate the potential of improved cowpea variety VBN 3 in ten farmers' holdings of Dharmapuri district during Rabi season of 2018-2019. The crop was grown with Improved crop management practices and compared with the farmers practice. The Improved crop management practices consisting of new variety i.e., VBN 3, seed treatment with rhizobium, soil application of TNAU pulses micronutrient mixture @ 7.5 kg ha, spraying of pulse wonder @ 5/ kg ha during flowering stage and Improved pest management strategies for sucking pest. The results of the demonstration revealed that the demonstration of Improved crop management practices recorded the higher number of pods per plant (35.6) and pod yield (9.55 q/ha). Farmers practice recorded the lower number of pods per plant (27.8) and pod yield (7.60 q/ha). The percent increase in yield under demonstration over farmers practice was 25.66. The higher net income (Rs.37800/ha) and benefit cost ratio (2.94) was realized in demonstration of Improved crop management practices. The lower net income (Rs.21400/ha) and benefit cost ratio (2.29) was recorded in farmers practice.

Key words: *Cowpea, Demonstration, Pod yield, Net income, Benefit cost ratio.*

INTRODUCTION

Cowpea (*Vigna unguiculata* (L.) Walp.aggreg.) is cultivated widely in the tropics and has multipurpose uses: as food for human beings, fodder for livestock and atmospheric nitrogen fixers. Cowpea grains rich in protein are consumed in different forms in several parts of the tropics. Cowpea cultivars grown for the immature pods that are used as a vegetable are variously known as asparagus bean, snake bean, and yard-long bean; when grown for dry or immature seed, they are known as black-eye pea, kaffir pea, china pea, and southern bean. Cowpea is well adapted to stress and has excellent nutritional qualities.

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It is a key dietary staple for the poorest sector of many developing countries and greatly improves an otherwise bland and unbalanced diet. It serves as a good source of vegetable proteins and its seeds contains 22- 24 per cent protein. Being a legume, it can fix atmospheric nitrogen to the extent of 150 kg/ha besides it enrich the soil fertility through addition of crop residues (Rochester et al., 1998). It is a drought tolerant crop and grows well in dry lands with limited rainfall. Cowpea is cultivated in 12999 hactares in Dharmapuri District. Farmers used to cultivate the crop under rainfed condition especially during *kharif* season immediately after receiving rainfall without any preparatory tillage and addition of manures. Due to the non adoption of improved management practices, imbalanced and indiscriminate use of pesticides farmers getting low yield and income. Apart from this the varieties available for cultivation are non - synchronized maturity in nature. Hence the farmers have to harvest the cowpea in two to three times which requires more labour, time and money and thus the total cost of cultivation was more. As non - availability of labour and cost of labour is the major issue in crop cultivation now a days, this has to be managed effectively. Hence, the present frontline demonstration was taken up by Krishi Vigyan Kendra in order to create awareness among the farmers and to demonstrate the impact of Improved crop management practices on increasing the yield and income.

MATERIALS AND METHODS

Krishi Vigyan Kendra, Dharmapuri intervened with frontline demonstration on Improved crop management in Cowpea during Kharif 2018 in ten farmers' holdings of Dharmapuri district to overcome the problems faced by the farmers in cowpea cultivation. In the demonstration, improved variety VBN 3 was grown in 0.2 ha area with Improved crop management practices and the farmers practice in 0.2 ha area for comparison. The Improved crop management practices consist of new variety VBN 3, seed treatment with rhizobium, *Pseudomonas fluorescence* @ 10g/kg and *Trichoderma viridi* @ 4 gm/ kg of seed, soil application of TNAU pulses micronutrient mixture @ 7.5 kg ha as basal, spraying of pulse wonder @ 5 kg ha during flowering stage and Improved pest management strategies were demonstrated.

Special features of Cowpea VBN 3

The variety VBN 3 introduced under demonstration was released from Tamil Nadu Agricultural University, Coimbatore during 2018 with duration of is 75 -80 days and matures in 78 days with 28- 34 pods/ plant. Semi erect and determinate plant type with synchronized maturity, resistant to pod borer and pod bug, resistance to rust, anthracnose and bean common mosaic virus. It is a synchronized maturing variety which is amenable for single harvest saving labour and time. It is suitable for sowing during kharif and rabi season. It can give grain yield of 1000 qtls/ha under rainfed condition.

The technological interventions followed in farmers practice and demonstration is given in Table 1. Before conducting the demonstration, the beneficiary farmers were given with skill training on various technological interventions to be followed in cowpea cultivation. The soil samples were collected from the demonstrated fields and analysed for major nutrients. The performance of crop was periodically observed by the scientists of Krishi Vigyan Kendra and crop advisory recommendations were followed. During harvest, yield data was collected from both the demonstration and farmers practice. At the end, cost of cultivation, net income and cost benefit ratio were worked out.

Table 1: Particulars of the technological interventions followed under farmers practice and demonstration on cowpea

S.No.	Technological interventions	Farmers cultivation practice	Frontline Demonstration (Recommended Improved crop management practices)
1.	Farming situation	Rainfed	Rainfed
2.	Variety	Local (Photo sensitive)	VBN 3 ((Photo insensitive)
3.	Time of Sowing	Second week of July	Third week of July
4.	Seed treatment	Seed treatment practice not followed	Seed treatment with *Rhizobium* and *Phospho bacteria* @ 20g/kg; *Pseudomonas fluorescens* @ 10g/kg and *Trichoderma viridi* @ 4 gm/ kg of seed
5.	Method of sowing	Broadcasting of seeds or dibbling	Hand dibbling on ridges by following a spacing of 45 x 15 cm
6.	Fertilizer application	Basal application of 20: 20: 20 complex fertilizer @ 50 kg/ha No addition of micronutrient mixtures.	Recommended INM practices Soil application of FYM @ 12 t/ha and recommended dose of NPK fertilizers i.e., 25:50:25 kg /ha Basal application of pulses micronutrient mixture @ 7.5 kg/ha Foliar spray of pulse wonder @ 5 kg/ha at 50 % flowering
7.	Weed management	Hand weeding	One hand weeding on 20-25 days after sowing
8.	Plant protection	Spraying of pesticides at regular interval without proper dose	Need based usage of plant protection chemicals

RESULTS AND DISCUSSION

Growth and Yield characteristics

The performance of cowpea under demonstration and farmers practice was observed (Table 2). Results revealed that, the demonstration of cowpea variety VBN 3 with Improved crop management practices recorded more number of branches per plant (15.6) and pods per plant (35.6). The lower number of branches per plant (10.2) and pods per plant (27.8) were recorded in farmers practice. Cow pea under demonstration mature early (78 days) compare to farmers practice (85 days).

The damage incidence of pod borer (4.2%), bean mosaic virus (5%) and rust (4%) were lower in demonstration and higher in farmers practice viz., pod borer (15.7%), bean mosaic virus (5%) and rust (12%). Lower damage incidence in demonstration might be due to the adoption of Improved pest and disease management strategies *viz*., placing pheromone traps, need based usage of pesticides. Similar results of reduction in pest and disease incidence due to adoption of Improved pest management practices in brinjal were reported by Govardhan Rao (2015).

Demonstration of Improved crop management practices recorded the higher pod yield (9.55 q/ha) and farmers practice recorded the lower pod yield (7.60 q/ha). The per cent increase in the pod yield of demonstration over farmers practice was 25.66. The yield improvement in the demonstration might be due to the combined effect of high yielding ability of variety and adoption of Improved nutrient, pest and disease management practices. Similar results have been reported earlier by Mishra (2009), Poonia & Pithia (2011), & Sharma (2013) in potato, chickpea and coriander respectively.

Table 2: Performance of Improved crop management practices on yield and economics of Cowpea

S.No.	Parameter	Farmers practice	Frontline Demonstration (Recommended Improved crop management practices)
1.	Plant height	**25.4**	**36.5**
2.	Number of branches per plant	10.2	15.6
3.	Number of pods per plant	27.8	35.6
4.	Days to maturity	85	78
5.	100 Seed weight (g)	2.5	3.8
6.	Bean mosaic virus	15	5
7.	Rust	12	4
8.	Pod borer incidence (%)	15.7	4.2
9.	Pod Yield (kg/ha)	955	760
10.	% increase in Pod yield over FP	-	25.66
11.	Gross cost (Rs./ha)	16600	19500
12.	Gross income (Rs./ha)	38000	57300
13.	Net income (Rs./ha)	21400	37800
14.	BC Ratio	2.29	2.94
15.	Synchronization maturity (%)	40	80

Economics

The data on economic indicators indicated that, the higher cost of cultivation (Rs.19500/ha) was involved in demonstration as compared to Farmers practice (Rs. 16600/ha) (Table 2). The front line demonstration plots fetched higher net income of Rs. 37800/ha as compared to Rs.21400/ha with farmers practice. On an average Rs.16400/ha as additional income is attributed to the higher yield obtained in demonstration. Similar results of increase in net income due to adoption of Improved crop management practices were reported by Sreelakshmi (2012) & Singh (2017) in pigeonpea, moth bean and wheat respectively.

The higher benefit cost ratio (2.94) was realized in demonstration and lower benefit cost ratio (2.29) was realized in farmers practice. It showed the economic viability of the technology demonstrated through the frontline demonstration.

CONCLUSION

From the results of frontline demonstration it could be revealed that the yield and income of the cowpea growers were significantly increased by the cultivation of improved variety along with improved crop management practices. The farmers were highly satisfied with the performance of Cowpea variety VBN 3 and encouraged the other farmers to adopt the same in large scale in their locality thus pave way for horizontal spread of this variety.

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